CITY OF CHELSEA, MASSACHUSETTS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT NO.MA0101877

APRIL 2019

CITY OF CHELSEA

MASSACHUSETTS

COMBINED SEWER OVERFLOW CALENDAR YEAR 2018 ANNUAL REPORT

PREPARED BY:

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OVERVIEW

Under the jurisdiction of the National Pollutant Discharge Elimination System (NPDES) program, the U.S. Environmental Protection Agency (EPA) issued Permit No. MA0101877 to the City of Chelsea, Massachusetts on April 11, 2003. The latest re-issuance of this permit became effective on February 1, 2014. In accordance with the permit, the requirements of the Clean Water Act, and the requirements of the Massachusetts Clean Water Act, the City of Chelsea is authorized to discharge from four Combined Sewer Overflows (CSOs) as follows:

- CHE002 Located on Broadway and discharges to Boston Inner Harbor
- CHE003 Located on Winnisimmet Street and discharges to Chelsea River
- CHE004 Located on Pearl Street and discharges to Chelsea River
- CHE008 Located on Eastern Avenue and discharges to Chelsea River

A map indicating the location of each of these CSOs was previously provided. It should be noted that Chelsea permanently closed CHE002 on December 4, 2014. In accordance with Part I.F of the permit, Chelsea sent Notice of Elimination to regulatory agencies and stakeholders on December 4, 2014; however, a formal permit modification has not yet been received.

Part I.D of the NPDES permit requires that a report be submitted annually by April 30th, and this report was prepared to fulfill that requirement.

ACTIVATION FREQUENCY AND DISCHARGE VOLUME

Chelsea installed continuous CSO metering equipment in July of 2003 and replaced/updated this equipment in November 2014. In accordance with the NPDES permit, the discharge volume and duration for each of the CSO activations recorded in 2018 is provided in Appendix A. To summarize:

- CHE003 did not activate in 2018.
- CHE004 activated eight times with a total volume of 1,800,378 gallons.
- CHE008 activated 19 times with a total volume of 3,541,506 gallons.

Chelsea continues to work with the Massachusetts Water Resources Authority (MWRA) on comparison of CSO activation data from city flow meters with MWRA's measurements and hydraulic model predictions. The MWRA is currently undergoing a study of system-wide CSO performance, which should provide valuable data going forward. Please see the MWRA's Annual CSO Report for details.

PRECIPITATION DURING THE CALENDAR YEAR

Chelsea records precipitation data continuously with a rainfall gage at the Chelsea City Yard, located at 380 Beacham Street. In accordance with the NPDES permit, total rainfall, peak intensity, and average intensity between January 1, 2018 and December 31, 2018 are provided in Appendix B.

STATUS OF IMPLEMENTATION WORK

Chelsea is aggressively pursuing sewer separation and other infrastructure improvement projects that will reduce the quantity of stormwater entering its combined sewer system and, therefore, CSO activation frequency and volume. During 2018, construction on sewer separation and other utility improvements was completed or begun in the following areas of Chelsea:

- Maverick Street between Shurtleff Street and Highland Street
- Everett Avenue between City line and Carter Street
- Locust Street between Vale Street and Everett Avenue

Also in 2018, design of sewer separation and other utility improvements was on-going in the following areas of Chelsea:

- Broadway between City Hall Avenue and the Revere city line
- Essex Street between Pearl Street and Highland Street
- Highland Street between Maverick Street and Marginal Street

These projects are being funded through the City's Capital Improvement Plan, as well as various grant and loan programs.

NINE MINIMUM CONTROLS

In accordance with Part I.B of the most recent NPDES permit, Chelsea has reviewed and updated its Nine Minimum Control (NMC) program and has modified its NMC program to enhance its effectiveness. In collaboration with the MWRA, Chelsea's NMC program includes, but is not limited to:

1. **Proper operation and regular maintenance programs for the sewer system and the combined sewer overflows.**

   Each CSO structure and tidegate is inspected at least twice each month, once during high tide and once during low tide. These bi-monthly inspections allow us to promptly identify and correct any problems that might increase CSO activation frequency or discharge volume and also problems that could allow tidal waters to surge back into the sewer system. Written reports are completed for each inspection, and indicate the date, time, structure number, and operating condition of the CSO and tidegate. Copies of the inspection reports are maintained on file at the Water & Sewer Department.

   With the 2014 installation of new CSO monitoring equipment, including web-based data hosting of CSO data, Chelsea uses near-real-time operational data to identify maintenance concerns, such as malfunctions of metering equipment and tidegates. In addition, the web-based CSO application has added the capability to transmit alarms, including CSO activation and common indicators of operational dysfunction, providing improved operation and maintenance control for the CSOs.

   Approximately 30,000 linear feet of sewer/drain and 450 catch basins are cleaned each year. The spoils from these cleaning operations are transported to a disposal facility in Melrose, MA.

2. **Maximum use of the collection system for storage.**

   Maximum storage during wet weather events is obtained by properly regulating flow through the MWRA's Chelsea Creek Headworks and by maintaining CSO regulator weirs at the highest elevations possible while still preventing sanitary sewer overflows and providing necessary system flood control in large storms. Proper sewer system maintenance also maximizes storage capacity, including the fact that known sediment problem areas within the sewer system are inspected and, if necessary, cleaned prior to major storm events.

3. **Review and modification of the pretreatment program to ensure CSO impacts are minimized.**

   The MWRA maintains a comprehensive industrial pretreatment program that monitors all of the industrial users discharging to the Chelsea sewer system. This program is regularly reviewed and updated as part of the Deer Island Treatment Plant NPDES discharge permit.

   Outside discharges of septage, holding tank wastes, or other materials to the combined sewer system are prohibited by sewer use ordinances of both Chelsea and the MWRA.

4. Maximization of flow to the POTW for treatment.

Flow to the Deer Island Treatment Plant is maximized by proper regulation of flow through the MWRA's Chelsea Creek Headworks (MWRA is currently constructing a major upgrade of this facility), and through design and construction of the MWRA relief sewers and other sewer improvements. In addition, maximum use of storage capacity, as discussed above, maximizes flow to the treatment plant.

5. Prohibition of dry weather overflows from CSOs.

According to metering data, there were no dry weather discharges from any of the CSOs during the 2018 monitoring period. Providing adequate capacity and ensuring structural integrity in the sewer system prevents dry weather overflows.

With installation of new CSO monitoring equipment in 2014, web-based hosting of CSO data, and CSO activation alarms, Chelsea can now identify the occurrence of a dry-weather overflow at any of its CSOs in near real time.

6. Control of solid and floatable materials in CSOs.

Solid materials are controlled by the design and progressive installation of catch basins with minimum four-foot sumps and floatables control hoods, and through the proper operation and maintenance of sewer and drainage systems components as discussed above. Higher priority is also assigned to catch basins at lower elevations, and cleaning is performed more frequently.

Floatable materials are also controlled by the installation of underflow baffles in the CSO structures that maximize the amount of floatables captured for transport to the Deer Island Treatment Plant for proper treatment and disposal. Baffles were installed at CSO structures by MWRA during construction of the Chelsea Trunk Sewer and the Chelsea Branch Sewer projects in 2000-2001.

7. Pollution prevention programs that focus on contaminant reduction activities.

The main component of Chelsea's pollution prevention program is regular street sweeping. Each street in Chelsea is swept twice each month roughly between March 1 and December 31. Parking is prohibited during sweeping to maximize its benefit. Curbside waste collection is also coordinated with sweeping such that sweeping follows scheduled trash pickup by one day. The street sweeping program has been in effect for many years.

Chelsea maintains municipal trash receptacles strategically located throughout the city to reduce litter, which are emptied four times each week. The city owns a "Madvac" and vacuums litter that accumulates on sidewalks and curb lines on a regular schedule. In addition, Chelsea initiated the "Keep Chelsea Beautiful Campaign" to reduce street litter. Information concerning the "Keep Chelsea Beautiful Campaign" has been disseminated to the public through various partnered organizations in the city.

Chelsea is in compliance with its NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems, which in brief, is a regulation designed to reduce pollutants in stormwater through the implementation of structural and non-structural Best Management Practices.

8. Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts.

In accordance with Part I.C.5 of the most recent CSO NPDES permit, Chelsea has posted the required identification signs at each of the permitted CSOs and has duplicated these signs in Spanish due to the large percentage of Spanish-speaking people within the city.

In accordance with Part I.C.6 of the permit, in Chelsea issued an annual press release and updated the CSO information posted on its website to provide general information regarding CSOs, including potential health impacts, locations of CSO discharges, overall status of CSO abatement programs, and the most recent information about CSO activation frequencies and volumes. A copy of this Annual Report is also made available on the City's website.

In accordance with Part I.C.7 of the CSO NPDES permit, Chelsea provided 24-hour notification via email to regulators and identified stakeholders for all CSO activations in 2018.

9. Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

The MWRA has a comprehensive water quality monitoring program associated with the CSOs in its system, including Chelsea's CSOs. Chelsea is also in partnership with the EPA and the Mystic River Watershed Association, who regularly collect ambient water quality samples in the receiving waters surrounding Chelsea. Sampling data has indicated that elevated bacteria levels are present in the Chelsea and Island End rivers; however, to our knowledge, no direct correlation has been made to Chelsea CSO activations. Rather, efforts have been focused on suspected illicit connections to the drainage systems tributary to the stormwater outfalls discharging to these rivers.

SUMMARY AND CONCLUSIONS

With assistance from the MWRA, during this year, Chelsea has maintained compliance with the requirements of its NPDES permit and implementation of the Nine Minimum Controls. In addition, Chelsea plans to persist with the design and construction of sewer separation projects to minimize CSO activation frequencies and discharge volumes. Chelsea continues to strive to reduce pollutants discharged to our receiving waters from both CSO and stormwater outfalls.

APPENDIX A

2018 CSO ACTIVATION FREQUENCIES & VOLUMES

CSO 004

2018 Chelsea, MA CSO Activity

Event	Start	Stop	Duration (minutes)	MGD	Rain (in) Daily	Rain (in) Peak Hourly	Peak Interval (5 minutes)	Gallons
1	1/13/18 2:25	1/13/18 2:35	10	0.010201	1.06	0.38	0.11	10,201
2	5/15/18 16:40	5/15/18 17:20	40	0.387391	1.15	0.89	0.24	387,391
3	6/25/18 1:05	6/25/18 1:25	20	0.330479	0.85	0.82	0.32	330,479
4	6/28/18 9:25	6/28/18 9:50	25	0.216359	1.05	0.63	0.17	216,359
5	7/26/18 15:10	7/26/18 15:25	15	0.175643	0.6	0.52	0.24	175,643
6	8/4/18 10:40	8/4/18 10:50	10	0.009954	0.58	0.42	0.06	9,954
7	8/12/18 5:00	8/12/18 6:25	85	0.209163	1.78	0.79	0.22	209,163
8	9/18/18 10:10	9/18/18 10:40	30	0.461188	1.58	1.09	0.35	461,188
			Total Duration (minutes)					Total Gallons
			235					1,800,378

CSO 008
2018 Chelsea, MA CSO Activity

Event	Start	Stop	Duration (minutes)	MGD	Rain (in) Daily	Rain (in) Peak Hourly	Peak Interval (5 minutes)	Gallons
1	1/13/18 2:25	1/13/18 3:35	70	0.08355	1.06	0.38	0.11	83,550
2	4/16/18 17:45	4/16/18 17:55	10	0.002498	2.03	0.32	0.07	2,498
3	5/15/18 16:45	5/15/18 17:35	50	0.211061	1.15	0.86	0.24	211,061
4	6/25/18 1:05	6/25/18 1:55	50	0.174048	0.85	0.82	0.32	174,048
5	6/28/18 9:25	6/28/18 10:15	50	0.074955	1.05	0.63	0.17	74,955
6	7/17/18 13:35	7/17/18 13:40	5	0.000607	1.87	0.79	0.13	607
7	7/17/18 16:05	7/17/18 17:30	85	0.161154	"	"	"	161,154
8	7/22/18 22:15	7/23/18 6:20	485	1.216489	0.12	0.04	0.01	1,216,489
9	7/23/18 11:30	7/23/18 12:45	75	0.259056	0.13	0.04	0.02	259,056
10	7/26/18 15:15	7/26/18 15:40	25	0.196003	0.6	0.52	0.24	196,003
11	8/4/18 10:40	8/4/18 11:00	20	0.022414	0.58	0.42	0.06	22,414
12	8/11/18 11:30	8/11/18 11:40	10	0.00148	0.49	0.4	0.06	1,480
13	8/12/18 4:55	8/12/18 7:05	130	0.647758	1.78	0.79	0.22	647,758
14	8/17/18 17:35	8/17/18 17:40	5	0.005442	0.47	0.47	0.21	5,442
15	9/18/18 10:10	9/18/18 11:20	70	0.249065	1.58	1.09	0.35	249,065
16	9/25/18 22:25	9/25/18 23:15	50	0.094364	1.52	0.69	0.18	94,364
17	10/29/18 8:45	10/29/18 9:00	15	0.004304	0.59	0.38	0.05	4,304
18	11/3/18 5:20	11/3/18 6:30	50	0.072601	1.43	0.45	0.08	72,601
19	11/9/18 23:05	11/10/18 0:15	70	0.064657	1.08	0.42	0.05	64,657
		Total Duration	(minutes)					Total Gallons
			1325					3,541,506

APPENDIX B

2018 PRECIPITATION DATA

2018 PRECIPITATION DATA
CITY OF CHELSEA RAIN GAUGE
380 BEACHAM STREET

Date	Daily Total Rain (in)	Peak Intensity (in/hr)	Average Intensity (in/5-min)
01/12/18	0.55	0.19	0.04
01/13/18	1.06	0.38	0.11
01/17/18	0.18	0.10	0.01
01/22/18	0.08	0.03	0.01
01/23/18	0.98	0.35	0.05
01/28/18	0.02	0.02	0.01
01/31/18	0.02	0.01	0.01
02/01/18	0.03	0.03	0.01
02/02/18	0.27	0.09	0.01
02/04/18	0.28	0.09	0.02
02/05/18	0.23	0.18	0.02
02/07/18	0.32	0.14	0.02
02/10/18	0.21	0.15	0.02
02/11/18	0.68	0.10	0.02
02/16/18	0.02	0.01	0.01
02/18/18	0.52	0.29	0.03
02/19/18	0.04	0.03	0.01
02/23/18	0.20	0.07	0.01
02/25/18	0.53	0.09	0.02
03/02/18	2.56	0.30	0.03
03/05/18	0.05	0.05	0.01
03/07/18	0.52	0.21	0.02
03/08/18	0.83	0.19	0.02
03/09/18	0.26	0.06	0.01
03/10/18	0.06	0.05	0.01
03/13/18	0.18	0.07	0.01
03/14/18	0.49	0.37	0.04
03/22/18	0.23	0.14	0.02
03/24/18	0.01	0.01	0.01
03/25/18	0.06	0.02	0.01
03/28/18	0.01	0.01	0.01
03/29/18	0.01	0.01	0.01
03/30/18	0.05	0.02	0.02
04/02/18	0.06	0.06	0.01
04/03/18	0.42	0.12	0.02
04/04/18	0.20	0.12	0.03
04/06/18	0.22	0.07	0.02
04/07/18	0.01	0.01	0.01
04/12/18	0.05	0.05	0.01
04/15/18	0.13	0.06	0.02
04/16/18	2.03	0.32	0.07
04/19/18	0.17	0.08	0.01
04/25/18	0.70	0.23	0.05
04/26/18	0.20	0.11	0.02
04/27/18	0.36	0.14	0.03
04/29/18	0.06	0.04	0.01
04/30/18	0.17	0.06	0.01

Date	Daily Total Rain (in)	Peak Intensity (in/hr)	Average Intensity (in/5-min)
05/03/18	0.01	0.01	0.01
05/06/18	0.21	0.17	0.03
05/10/18	0.01	0.01	0.01
05/12/18	0.17	0.10	0.01
05/15/18	1.15	0.89	0.24
05/19/18	0.18	0.05	0.01
05/20/18	0.11	0.07	0.03
05/22/18	0.01	0.01	0.01
05/23/18	0.01	0.01	0.01
05/27/18	0.03	0.01	0.01
05/28/18	0.06	0.02	0.01
06/02/18	0.01	0.01	0.01
06/04/18	0.62	0.19	0.03
06/05/18	0.32	0.24	0.07
06/13/18	0.01	0.01	0.01
06/18/18	0.07	0.06	0.04
06/24/18	0.39	0.24	0.03
06/25/18	0.85	0.82	0.32
06/27/18	0.08	0.07	0.01
06/28/18	1.05	0.63	0.17
07/06/18	0.28	0.25	0.06
07/14/18	0.27	0.27	0.10
07/15/18	0.02	0.02	0.01
07/17/18	1.87	0.79	0.13
07/18/18	0.01	0.01	0.01
07/22/18	0.12	0.04	0.01
07/23/18	0.13	0.04	0.02
07/25/18	0.02	0.02	0.01
07/26/18	0.60	0.52	0.24
08/02/18	0.15	0.15	0.10
08/03/18	0.03	0.03	0.02
08/04/18	0.58	0.42	0.06
08/08/18	0.12	0.07	0.01
08/09/18	0.29	0.22	0.12
08/11/18	0.49	0.40	0.06
08/12/18	1.78	0.79	0.22
08/13/18	0.34	0.26	0.06
08/14/18	0.25	0.23	0.19
08/17/18	0.47	0.47	0.21
08/18/18	0.12	0.07	0.02
08/19/18	0.01	0.01	0.01
08/22/18	0.28	0.28	0.10
09/06/18	0.05	0.03	0.01
09/10/18	0.88	0.29	0.07
09/11/18	0.46	0.16	0.02
09/12/18	0.19	0.12	0.03
09/13/18	0.26	0.14	0.02
09/18/18	1.58	1.09	0.35
09/22/18	0.02	0.02	0.01
09/25/18	1.52	0.69	0.18
09/26/18	0.25	0.21	0.06

Date	Daily Total Rain (in)	Peak Intensity (in/hr)	Average Intensity (in/5-min)
09/27/18	0.03	0.02	0.01
09/28/18	0.34	0.14	0.02
10/01/18	0.08	0.03	0.01
10/02/18	0.34	0.10	0.02
10/03/18	0.19	0.13	0.02
10/07/18	0.09	0.04	0.01
10/08/18	0.01	0.01	0.01
10/11/18	0.55	0.23	0.05
10/12/18	0.06	0.04	0.02
10/13/18	0.10	0.04	0.01
10/15/18	0.06	0.04	0.02
10/16/18	0.04	0.04	0.01
10/21/18	0.01	0.01	0.01
10/23/18	0.32	0.19	0.08
10/24/18	0.04	0.02	0.01
10/27/18	1.77	0.32	0.05
10/28/18	0.04	0.01	0.01
10/29/18	0.59	0.38	0.05
11/02/18	0.34	0.19	0.05
11/03/18	1.43	0.45	0.08
11/05/18	0.44	0.17	0.04
11/06/18	0.67	0.18	0.05
11/09/18	1.08	0.42	0.05
11/10/18	0.39	0.20	0.03
11/13/18	1.12	0.20	0.03
11/16/18	1.42	0.32	0.04
11/19/18	0.28	0.04	0.01
11/20/18	0.43	0.10	0.02
11/25/18	0.67	0.31	0.03
11/26/18	1.03	0.19	0.03
11/27/18	0.77	0.18	0.03
12/02/18	0.75	0.16	0.01
12/03/18	0.01	0.01	0.01
12/16/18	0.65	0.21	0.03
12/17/18	0.06	0.02	0.01
12/21/18	0.60	0.11	0.02
12/22/18	0.01	0.01	0.01
12/28/18	0.26	0.11	0.01
12/31/18	0.35	0.15	0.02

ɔtal Rainfall (in): 52.53
Rainfall Events: 137